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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/823,600 | 03/30/2001 | David Chong Sook Lim | 17732-3856000 | 6055 |

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EXAMINER

ANDUJAR, LEONARDO

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2826

DATE MAILED: 04/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/823,600

Applicant(s)

SOOK LIM ET AL.

Examiner

Leonardo Andújar

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 9-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) 1-14 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-8, drawn to a semiconductor device, classified in class 257, subclass 678.
 - II. Claims 9-14, drawn to a method of manufacturing a semiconductor device, classified in class 438, subclass 106.
2. The inventions are distinct, each from the other because of the following reasons: Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, unpatentability of the Group I invention would not necessarily imply unpatentability of the Group II invention, because the device of Group I invention could be made by a process materially different from that of the Group II invention. For example, forming the plurality of leads over the die contacts in one step and attaching the leads to the substrate in a following step can materially alter the process of claim 9.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, the fields of search are not co-extensive and separate examination would be require, restriction for examination purposes as indicated is proper.

4. Applicant is advised that the response to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a diligently-filed petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(h).

6. During a telephone conversation with Edwin Paul on 03/18/2002 a provisional election was made with traverse to prosecute the invention of I, claims 1-8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-14. withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 2, 4, 5, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Suyama et al. (US 5731630).

9. Regarding claim 1, Suyama (e.g. fig. 4) shows a die attach package comprising:

- A substrate 1 having a plurality of leads 7 for connections to a die down die 8 and to a printed circuit board 101;
- An electrically and non-conductive means 9 to physically connect the die to the substrate 1;
- A plurality of connectors 22 corresponding in number to the number of leads to electrically connect the die to the leads.

10. Also, Suyama shows that the leads are arranged as a part of the substrate such that they pass under the die when the die is connected to the substrate.

11. Regarding claim 2, Suyama shows that the leads are formed as traces on the substrate.

12. Regarding claim 4, Suyama discloses that the substrate is an organic substrate (col.3 /lls.39-44).

13. Regarding claim 5, Suyama shows a first traces ends are connected to the substrate vias (e.g. 5 and 6). Also, the second traces ends are connected to the plurality of connectors. As shown in figure 4, the vias connect the traces to the printed circuit board.

14. Regarding claim 7, Suyama shows that the plurality of leas form part of a lead frame (e.g. fig. 8).

15. Regarding claim 8, Suyama disclose that the means to physically connect the die to the substrate is an adhesive (col. 4/ll. 17).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

18. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suyama et al. (US 5731630) in view of Akram (US 6,064,116).

19. Suyama shows most aspects of the instant invention including a substrate made of an organic material such as glass epoxy (see comments above). However, Suyama does not explicitly suggest the use of ceramic as substrate material. Akram teaches that ceramic materials are widely used as substrate material. Moreover, Akram discloses that ceramics are superior in heat transfer characteristics than glass epoxy (col. 1/lls. 54-55). It would have been obvious to one of ordinary skill in the art at the

time the invention was made to make Suyama's substrate of ceramic in order to have a substrate with superior heat transfer characteristics as taught by Akram.

20. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suyama et al. (US 5731630) in view of Wang (US 2001/0033017).

21. Suyama shows most aspects of the instant invention including a plurality of connectors 22 such as solder (see comments above). However, Suyama does not explicitly suggest the use of wires. Wang teaches that the selection of the bonding technique (solder or wire bonding) is a matter of design choice e.g. desired number and spacing of signal input-output (I/O) connections on the chip and the substrate as well as permissible cost [0005]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use metal wires as connectors in Suyama's invention since the use of wire or solder bonding is a matter of design choice as taught by Wang.

Conclusion

22. Papers related to this application may be submitted directly to Art Unit 2826 by facsimile transmission. Papers should be faxed to Art Unit 2826 via the Art Unit 2826 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2826 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2826 Fax Center is to be used only for papers related to Art Unit 2814 applications.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Leonardo Andújar** at **(703) 308-0080** and between the

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hours of 9:00 AM to 5:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via Leonardo.Andujar@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on (703) 308-6601.

24. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 305-3900**.

25. The following list is the Examiner's field of search for the present Office Action:

| Field of Search | |
|---|-------|
| U.S. Class / Subclass (es): 257/678, 693 and 697 | 03/02 |
| Other Documentation: | |
| Electronic Database(s): East (USPAT, US PGPUB, JPO, EPO, Derwent, IBM TDB) | 03/02 |

Leonardo Andujar

Patent Examiner Art Unit 2826

LA

3/18/02

